



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/088,982	03/26/2002	Tatsunori Koyanagi	55166US006	6614

32692 7590 07/03/2003

3M INNOVATIVE PROPERTIES COMPANY
PO BOX 33427
ST. PAUL, MN 55133-3427

EXAMINER

PATEL, ISHWARBHAI B

ART UNIT

PAPER NUMBER

2827

DATE MAILED: 07/03/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/088,982

Applicant(s)

KOYANAGI, TATSUNORI

Examiner

Ishwar (I. B.) Patel

Art Unit

2827

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-5 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 March 2002 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). ____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) - 6) ☐ Other:

DETAILED ACTION

Drawings

1. The drawings are objected to because the figures are improperly cross hatched. All of the parts shown in section, and only those parts, must be cross hatched. The cross hatching patterns should be selected from those shown on page 600-114/115 of the MPEP based on the material of the part.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

2. This application does not contain an abstract of the disclosure as required by 37 CFR 1.72(b). An abstract on a separate sheet is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claim 1 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 1, "an interface layer interposed between the insulating layer and the first and second conductive layers", is not clear.

Is the interface layer between first conductive layer and the insulating layer or the second conductive layer and the insulating layer?

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1 and 2 are rejected under 35 U.S.C. 102(b) as being anticipated by Chang et al., US Patent No. 5,774,340, hereafter, Chang.

Regarding claim 1, Chang discloses a multi-layer double-sided wiring board comprising:

an insulating layer having an opening formed therein; a first conductive layer formed on an upper surface of the insulating layer (redistribution structure 12 with insulating layer 28, having input / output pads 34 and lines 36 on top surface 30, see figure 1, column 2, line 25-50);

a second conductive layer formed on a lower surface of the insulating layer and covering an inside wall of the opening and a portion of the first conductive layer which is exposed in the opening (plating layer 44 / 46, see figure 1, column 3, line 1-15); and

an interface layer interposed between the insulating layer and the first and

second conductive layers (conductive layer 48, see figure 1, column 3, line 1-10),
wherein

the second conductive layer directly contacts the first conductive layer in the opening without the interface layer being interposed there between (plating layer 44 directly in contact with input / output pads 34, see figure 1).

Regarding claim 2, Chang further discloses the second conductive layer directly contacts the insulating layer at the inside wall of the opening without the interface layer being interposed there between, see figure 1.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 3-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chang et al., US Patent No. 5,774,340, hereafter, Chang, as applied to claims 1-2 above, and further in view of Arledge et al., US Patent No. 5,576,052, hereafter, Arledge.

Regarding claim 3, the applicant is claiming the interface layer contains at least one metallic element selected from the group consisting of nickel, cobalt, zinc, and chromium.

Chang does not disclose such material for the interface layer. However, using such layer, either directly on the metal layer or on the insulating layer is known in the art for better adhesion of the subsequent layer and resultant better conductive connection.

Arledge discloses chromium adhesion promotion layer prior to copper layer, see Arledge, column 2, line 31-45.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the structure of Chang with the interface layer containing Chromium, as taught by Arledge, in order to have better adhesion of subsequent copper plating.

Regarding claims 4-5, the applicant is claiming the method steps for the product, which are obvious in view of the product claims as applied to claims 1-3.

Claim Rejections - 35 USC § 102

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting

directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

10. Claims 1-2 rejected under 35 U.S.C. 102(e) as being anticipated by Ishida, US Patent No. 6,020,561, hereafter, Ishida.

Regarding claim 1, Ishida discloses a multi-layer double-sided wiring board comprising:

an insulating layer having an opening formed therein; a first conductive layer formed on an upper surface of the insulating layer (insulating layer 66b with conductive layer 64b, see figure 3, column 3, line 14-30);

a second conductive layer formed on a lower surface of the insulating layer and covering an inside wall of the opening and a portion of the first conductive layer which is exposed in the opening (conductive layer 68, see figure 3, column 3, line 14-30); and

an interface layer interposed between the insulating layer and the first and second conductive layers (conductive layer 64a, see figure 3, column 3, line 14-30), wherein

the second conductive layer directly contacts the first conductive layer in the opening without the interface layer being interposed there between (conductive layer 68 directly in contact with conductive layer 64b, see figure 3).

Regarding claim 2, Chang further discloses the second conductive layer directly contacts the insulating layer at the inside wall of the opening without the interface layer being interposed there between, see figure 3.

11. Claims 3-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishida et al., US Patent No. 6,020,561, hereafter, Ishida, in view of Arledge et al., US Patent No. 5,576,052, hereafter, Arledge.

Regarding claim 3, the applicant is claiming the interface layer contains at least one metallic element selected from the group consisting of nickel, cobalt, zinc, and chromium.

Ishida does not disclose such material for the interface layer. However, Ishida discloses that the conductive layers may comprise a multilayered metallurgy, column 3, line 30-31. Further, using adhesion promotion layer or barrier layer, is known in the art for better adhesion of the subsequent layer or stopping the migration of one element of a conductive layer to the other conductive layer.

Arledge discloses chromium adhesion promotion layer prior to copper layer, see Arledge, column 2, line 31-45.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the structure of Ishida with the interface

layer containing Chromium, as taught by Arledge, in order to have better adhesion of subsequent copper plating.

Regarding claims 4-5, the applicant is claiming the method steps for the product, which are obvious in view of the product claims as applied to claims 1-3.

Conclusion

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

L J Quintana discloses a multilayer circuit board with second conductive layer directly in contact with the first conductive layer on other side of insulting board, see figure 7, bottom via.

Burgess, Shin et al., Yasuda et al., and Park et al., disclose second conductive layer directly in contact with the first conductive layer on other side of insulting board, see Burgess figure 9, Shin et al., figure 4f and 4g, Yasuda et al., figure 10, and Park et al., figure 7e and 7f.

Shanefield et al., disclose adhesive promotion layer selected from the group consisting of Cr, Ni, Ni-V, Pd, or Pt, column 3, line 60-67.

Kamagai et al., disclose adhesive promotion chromium layer, column 4, line 30-40.

Application/Control Number: 10/088,982
Art Unit: 2827


Page 9

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ishwar (I. B.) Patel whose telephone number is (703) 305 2617. The examiner can normally be reached on M-F (8:30 - 5).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David L Talbott can be reached on (703) 305 9883. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305 3431 for regular communications and (703) 305 7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308 0956.

ibp
June 24, 2003


KAMAND CLINE
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2300